

Claims

1. A method of establishing a communication between at least two communication units (202, 208) in a digital communication system (200), wherein a first communication unit (202) operates on a long delay link and a second communication unit (208) operates on a short delay link, **characterized in that** transmission (118) of audio data blocks is delayed (302) on the short delay link's site.

2. The method according to claim 1 comprising the steps:

- a) initiating a call set-up phase (110) between a first Base Station (BS) (102) and a second BS (108) and a Call Processing Server (CPS) (106), wherein the first BS (102) operates on the long delay link and the second BS (108) operates on the short delay link;
- b) sending by the CPS (106) a Channel Grant instruction (112) to the first BS (102) and to the second BS (108);
- c) joining (114) by the first BS and the second BS a multicast group;
- d) creating a multicast tree;
- e) transmitting (118) the audio data blocks to the multicast tree.

3. The method according to claim 1 or claim 2, wherein a value of the delay (302) added on the short delay link is approximately equal to twice a difference between the value of the one way propagation time on the long delay link and one way propagation time on the short delay link.

4. The method according to claim 3, wherein the one way propagation times on the short delay link and on the long delay link are predefined and provided by the first BS (102) and the second BS (108).

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5. The method according to claim 3, wherein the one way propagation times on the short delay link and on the long delay link are measured by a network infrastructure.

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6. The method according to claim 5, wherein the one way propagation times on the short delay link and the long delay link are measured by the CPS (106).

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7. The method according to any one of claims 2 to 6, wherein said step of transmitting (118) of the audio data blocks is delayed (302) by delaying sending the Grant Channel instruction to the second BS (108).

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8. The method according to any one of claims 2 to 6, wherein said step of transmitting (118) of the audio data blocks is delayed by buffering the audio data blocks in the second BS (108).

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9. The method according to any one of claims 2 to 6, wherein said step of transmitting (118) of the audio data blocks is delayed by buffering the audio data blocks in a Rendezvous Point (RP) router (104).

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10. The method according to any one of claims 1 to 6, wherein said step of transmitting (118) of the audio data blocks is delayed by buffering the audio data blocks in the second communication unit (208).

11. The method according to any one of claims 1 to 6, wherein said step of transmitting (118) of the audio data blocks is delayed by buffering the audio data blocks in the CPS (106).

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12. The method according to claim 5 or claim 6, wherein a pinging procedure is used for the measuring.

13. The method according to any one of claims 1 to 3 or 10 claim 5 or claim 6, wherein the delay (302) dynamically varies, while any one of the communication units switch to another link with different one way propagation time.

14. The method according to any one of preceding 15 claims, wherein the first communication unit (202) and the second communication unit (208) notify their users that they operate on a connection with a long delay.

15. The method according to claim 14 wherein for said 20 notification an audio or visual signal is used.

16. The method according to any one of preceding 25 claims, wherein the communication between the first communication unit (202) and the second communication unit (208) is a simplex communication.

17. The method according to any one of preceding 30 claims, wherein the communication between the first communication unit (202) and the second communication unit (208) is a duplex communication.

18. The method according to any one of preceding 35 claims, wherein the communication between the first communication unit (202) and the second communication unit (208) is secured by an end-to-end encryption.

19. The method according to claim 18, wherein synchronization data blocks replace a corresponding amount of the audio data blocks at a beginning of data stream.

20. The method according to any one of preceding claims, wherein the communication between the at least two communication units is a call using a direct set-up method.

21. The method according to any one of preceding claims, wherein said step of transmitting (118) of the audio data blocks is delayed in a first speech item.

22. The method according to any one of preceding claims, wherein said first communication unit (202) and said second communication unit (208) operate in different communication systems.

23. A digital communication system (200) adapted to operate according to the method defined in claims 1 to 22.

24. A communication unit adapted to operate according to the method defined in claims 1 to 22.

25. The communication unit according to claim 23, wherein the communication unit is a TETRA radio or an ASTRO/APCO 25 radio or an IDEN radio, a GSM radio, a GSM-R radio or any digital radio system utilizing a low rate vocoder.